REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
--	Original Released	7/18/94	ELB
A	Revised and Released	8/5/94	ELB
B	Revised per RN 075	9/14/95	

SHEET REVISION STATUS

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REVISION	B	B	B																	
SHEET	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REVISION																				

ORIGINATOR S. A. Naus/GSFC	DATE 8/3/94	FSC: 5935
APPROVED N/A		Thermofoil, Heater, Detailed Specification for
CODE 311 APPROVAL S. A. Naus/GSFC	8/3/94	
CODE 311 SUPERVISORY APVL R. L. Chinnapongse/GSFC	8/4/94	
ADDITIONAL APPROVAL		S-311-P-079/11

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

CAGE CODE

1. SCOPE.

1.1 Purpose. This specification delineates the detailed requirements for thermofoil heater to be used in space flight applications with 120V DC at Goddard Space Flight Center (GSFC).

1.2 Part Number Marking. The part number marking shall be in accordance with S-311-079.

2. APPLICABLE DOCUMENTS

2.1 Documents. The following documents, of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein. A later revision of a specification may be used as long as the later revision does not degrade the specification requirements.

Specifications

S-311-079 Thermofoil Heaters, General Specification for

2.2 Order of precedence. In the event of conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specified exemption has been granted.

3. REQUIREMENTS

3.1 General. The thermofoil heaters procured to this specification shall meet the general requirements of S-311-079.

3.2 Design and Construction. The heaters shall be of the design, construction and physical dimension specified in figure 1.

3.3 DC Resistance (DCR). The DCR of the heaters shall be on accordance with Table 1.

3.4 Power Rating. The power rating, when tested in air, shall be in accordance with Table1.

3.5 Heater Element. The heater element circuitry layout shall be non-inductive and shall provide maximum uniform packing density for uniform heat transfer over the heat sink surface area.

3.6 Adhesives. All heaters shall be coated on one side with pressure sensitive adhesive (Minnesota, Mining and Manufacturing (3M) Type 966) with release paper backing. The internal adhesive shall be FEP adhesive or Dupont Paralux (Type WA). If Paralux is used, the maximum thermal shock test temperature shall be reduced to 150C and the MAX WATTS/VOLT column in Table one for still air testing shall be reduced by 30% of the wattage and 15% of the voltage (see 6.2).

3.7 Lead Attachment. A drill and patch method of lead attachment between heater and leads is acceptable for the -01 and -02 part numbers.

4. QUALITY ASSURANCE PROVISIONS

4.1 Qualification. The Qualification inspections shall be in accordance with S-311-079.

4.2 Quality Conformance Inspection. The Quality Conformance Inspection (QCI) shall be in accordance with S-311-079.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packing shall be in accordance with MIL-C-55330. The manufacturer shall be responsible for any damage to or deterioration of heater resulting from faulty or improperly packing, preservation or packaging, and shall replace heaters without cost to the procuring agency.

6. NOTES.

6.1 Heaters -01 to -08 are designed for less than 2 watts per square inch at 120V dc.

6.2 If Paralux is used as the internal adhesive, the maximum watt density curves in Figure 1 of the general specification shoul be derated by shifting each of the curves down 30% relative to the 50C axis; paralux adhesive 50C values will be 5.5, 2 and 0.31 watts/cm2 and derate to zero at temperatures of 125C, 100C and 150C respectively.

Table 1

Part No.	DCR (ohms) (+/- 2%	Max Watts/Volts suspended in still Air @ 25C	A (cm/in)	B (cm/in)	C (m/ft)	Watts at 118V (ref only)
-01	1400	15.6/148	10.2/4.0	3.8/1.5	3.05/10	10
-02	1150	15.6/134	10.2/4.0	3.8/1.5	3.05/10	12
-03	698	31.2/148	10.2/4.0	7.6/3.0	3.05/10	20
-04	634	31.2/141	10.2/4.0	7.6/3.0	3.05/10	22
-05	604	31.2/137	10.2/4.0	7.6/3.0	3.05/10	23
-06	562	31.2/132	10.2/4.0	7.6/3.0	3.05/10	25
-07	357	62.4/149	15.2/6.0	10.2/4.0	3.05/10	40
-08	200	125/158	22.0/9.0	10.2/4.0	3.05/10	70

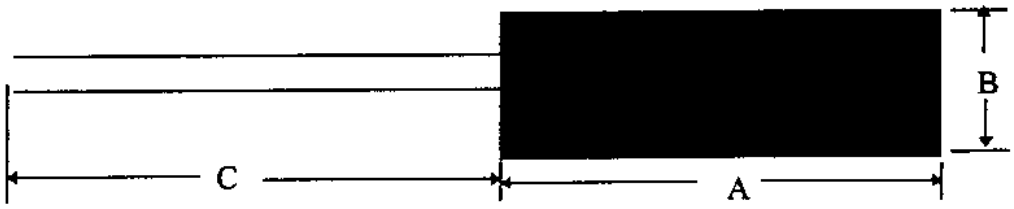

FIGURE 1